I CLAIM AS MY INVENTION:

1. A method for treating an abnormal neurological condition comprising the steps of applying to brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters, at least one of which pulse parameters vary during the burst.

2. The method of claim 1 wherein at least two of said pulse parameters vary during the burst.

3. The method of claim 1 wherein said burst is synchronized to detected electrical activity of the brain.

4. The method of claim 1 wherein said detected electrical activity is an epileptiform electrical activity.

5. The method of claim 1 wherein said detected electrical activity predicts impending epileptiform electrical activity.

6. The method of claim 1 wherein said pulse parameters are selected from the group consisting of selected electrode, pulse width, pulse amplitude, pulse polarity, and pulse-to-pulse interval.

7. The method of claim 1 wherein said at least one pulse parameter is pulse-to-pulse interval.

8. The method of claim 7 wherein said pulse-to-pulse interval is between about 3 and 300 microseconds.

9. The method of claim 7 wherein said pulse-to-pulse interval is randomly varied for at least a portion of the burst.

10. The method of claim 7 wherein said pulse-to-pulse interval is pseudo-randomly varied for at least a portion of the burst.

11. The method of claim 7 wherein said pulse-to-pulse interval is fractally varied for at least a portion of the burst.

12. The method of claim 7 wherein said pulse-to-pulse interval is incrementally increased for at least a portion of the burst.

13. The method of claim 7 wherein said pulse-to-pulse interval is incrementally decreased for at least a portion of the burst.

14. The method of claim 7 wherein said pulse-to-pulse interval is varied effectively to avoid initiation of epileptiform activity.

15. The method of claim 7 further including the step of delivering a hyper-polarizing pulse to said brain tissue prior to initiating the application of said at least one electrical pulse.

16. The method of claim 15 wherein said hyper-polarizing pulse is 40 to 500 microseconds in length.

17. The method of claim 15 wherein said hyper-polarizing pulse is comparatively lower in amplitude and longer in pulse length than pulses in said at least one electrical burst.

18. The method of claim 7 wherein said electrical signal in the brain is epileptiform activity and said method further includes the step of detecting said electrical signal in the brain prior to initiating the application of said at least one electrical burst.

19. The method of claim 18 wherein said at least one pulse parameter is related to said detected electrical signal in the brain

20. The method of claim 18 further including the step of determining the interval of said electrical signal in the brain prior to initiating the application of said at least one electrical burst.

21. The method of claim 20 wherein said at least one pulse parameter is related to said detected epileptiform pulse-to-pulse interval in the brain.

22. The method of claim 20 wherein said pulse-to-pulse interval is varied in length between about 10% and about 400% of said epileptiform interval.

23. The method of claim 1 wherein said at least one pulse parameter is pulse amplitude.

24. The method of claim 23 wherein said pulse amplitude is randomly varied for at least a portion of the burst.

25. The method of claim 23 wherein said pulse amplitude is pseudo-randomly varied for at least a portion of the burst.

26. The method of claim 23 wherein said pulse amplitude is fractally varied for at least a portion of the burst.

27. The method of claim 23 wherein said pulse amplitude is incrementally increased for at least a portion of the burst.

28. The method of claim 23 wherein said pulse amplitude is incrementally decreased for at least a portion of the burst.

29. The method of claim 23 further including the step delivering a hyper-polarizing pulse to said brain tissue prior to initiating the application of said at least one electrical pulse.

30. The method of claim 29 wherein said hyper-polarizing pulse is 40 to 500 microseconds in length.

31. The method of claim 29 wherein said hyper-polarizing pulse is comparatively lower in amplitude and longer in pulse length than pulses in said at least one electrical burst.

32. The method of claim 1 wherein said at least one pulse parameter is pulse width.

33. The method of claim 32 wherein said pulse width is randomly varied for at least a portion of the burst.

34. The method of claim 32 wherein said pulse width is pseudo-randomly varied for at least a portion of the burst.

35. The method of claim 32 wherein said pulse width is fractally varied for at least a portion of the burst.

36. The method of claim 32 wherein said pulse width is incrementally increased for at least a portion of the burst.

37. The method of claim 32 wherein said pulse width is incrementally decreased for at least a portion of the burst.

38. The method of claim 32 further including the step delivering a hyper-polarizing pulse to said brain tissue prior to initiating the application of said at least one electrical pulse.

39. The method of claim 38 wherein said hyper-polarizing pulse is 40 to 5000 microseconds in length.

40. The method of claim 38 wherein said hyper-polarizing pulse is comparatively lower in amplitude and longer in pulse length than pulses in said at least one electrical burst.

Sub A8

41. The method of claim 1 wherein said electrical signal in the brain is epileptiform activity and said method further includes the steps of detecting said electrical signal in the brain prior to initiating the application of said at least one electrical burst, determining the both the interval of said electrical signal in the brain prior to initiating the application of said at least one electrical burst and characteristic of the electrical signal, and delaying the initiation of the application of said at least one electrical burst after the onset of characteristic of the electrical signal for a period of time between 5% and about 100% of said interval of said electrical signal.

42. The method of claim 1 wherein said electrical signal is an epileptiform electrical activity, said method further comprising the steps of again detecting said electrical signal in the brain after the application of said at least one electrical burst and analyzing said electrical signal for epileptiform activity.

43. The method of claim 42 wherein said re-analyzed electrical signal shows epileptiform electrical activity, said method comprising the further step of again applying to said brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters, at least one of which pulse parameters vary during the burst.

44. The method of claim 43 wherein the one or pulse parameters varied in said re-applied at least one electrical burst are different than the pulse parameters varied in said at least one electrical burst.

45. The method of claim 44 wherein said steps are repeated up to ten times.

SUB A9

46. The method of claim 1 comprising the steps of applying to brain tissue, electrical bursts comprising a multiplicity of pulses independently to different electrodes spatially separated in said brain, said pulses having pulse parameters, at least one of which pulse parameters independently varies during the bursts.

47. The method of claim 46 wherein said multiplicity of pulses are delivered simultaneously to said electrodes.

48. The method of claim 46 wherein said multiplicity of pulses delivered to said electrodes are configured to treat a multi-focal epilepsy.

49. The method of claim 46 wherein said electrical signal is an epileptiform electrical activity and wherein said electrodes are located near an epileptigenic focus, said method further comprising applying comparatively lower amplitude pulses to electrodes spatially closer to the epileptigenic focus.

50. An implantable neurostimulator assembly for treating a disorder in a human brain, comprising in combination:

a.) at least a first electrical neurostimulator electrode, and

b.) at least a first electrical signal source connectable to said at least first electrical neurostimulator electrode, said first electrical signal source initiating a stimulation burst to said at least a first electrical neurostimulation electrode, said burst comprising pulses having pulse parameters, which pulse parameters vary during said burst.

51. The implantable neurostimulator of claim 50 further comprising at least a first brain electrical activity sensor for sensing electrical activity in said brain.

52. The implantable neurostimulator of claim 50 wherein said first electrical signal source is configured to vary pulse parameters selected from the group consisting of electrode choice, pulse width, pulse amplitude, pulse polarity, and applied pulse-to-pulse interval.

53. The implantable neurostimulator of claim 50 wherein said first electrical signal source is configured to vary said pulse parameters randomly, pseudo-randomly, fractally, incrementally increasing, incrementally decreasing, or effectively to avoid initiation of epileptiform activity.

54. The implantable neurostimulator of claim 50 wherein said first electrical signal source is configured to deliver a hyper-polarizing pulse to said brain tissue prior to initiating the application of said at least one electrical burst.

55. The implantable neurostimulator of claim 54 wherein said hyper-polarizing pulse is 40 to 5000 microseconds in length.

56. The implantable neurostimulator of claim 54 wherein said hyper-polarizing pulse is comparatively lower in amplitude and longer in pulse length than pulses in said at least one electrical burst.

57. The implantable neurostimulator of claim 50 wherein said at least a first brain electrical activity sensor is configured to detect epileptiform activity prior to initiating the application of said at least one electrical burst.

58. The implantable neurostimulator of claim 50 wherein said at least a first brain electrical activity sensor is configured to determine the epileptiform pulse-to-pulse interval of said electrical signal in the brain prior to initiating the application of said at least one electrical burst.

59. The implantable neurostimulator of claim 58 wherein said first electrical signal source is configured to deliver an applied pulse-to-pulse interval that is varied in length between about 105% and about 400% of said epileptiform pulse-to-pulse interval.

60. The implantable neurostimulator of claim 58 wherein said first electrical signal source is configured to again apply to said brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters, at least one of which pulse parameters vary during the burst, when said at least a first brain electrical activity sensor detects epileptiform electrical activity after application of said first electrical burst.

61. The implantable neurostimulator of claim 58 wherein said first electrical signal source is configured to vary said one or pulse parameters in said re-applied at least one electrical burst that are different than the pulse parameters varied in said at least one electrical burst.

62. The implantable neurostimulator of claim 50 wherein said first brain electrical activity sensor comprises multiple sensors.

63. The implantable neurostimulator of claim 62 wherein said multiple brain electrical activity sensors comprises sensors for measuring said at least one brain electrical activity of said brain simultaneously at different sites in said brain.

64. The implantable neurostimulator of claim 62 wherein said sensors are configured to measure said brain activity at a depth within the brain.

65. The implantable neurostimulator of claim 62 wherein said sensors are configured to measure said brain activity on the scalp.

66. A method for treating an abnormal neurological condition comprising the steps of applying to brain tissue at least one electrical burst comprising a multiplicity of pulses, said at least one electrical burst being synchronized to detected electrical activity of the brain.

67. The method of claim 66 wherein said detected electrical activity is an epileptiform electrical activity.

68. The method of claim 66 wherein said detected electrical activity predicts impending epileptiform electrical activity.

SUB A5

69. A method for treating an abnormal neurological condition comprising the steps of determining the interval of an electrical signal in the brain and applying to brain tissue at least one electrical burst comprising a multiplicity of pulses, said pulses having pulse parameters related to said detected interval in the brain.

70. The method of claim 69 wherein said detected interval comprises epileptiform pulse-to-pulse intervals.

71. The method of claim 70 wherein said pulse-to-pulse interval is varied in length between about 10% and about 400% of said epileptiform pulse-to-pulse interval.

72. A method for treating an abnormal neurological condition comprising the steps of detecting an electrical signal in the brain prior to initiating the application of at least one electrical burst, determining the interval of said electrical signal in the brain prior to initiating the application of said at least one electrical burst and delaying the initiation of the application of said at least one electrical burst after the onset of the detected electrical signal for a period of time between 5% and about 100% of said interval of said electrical signal.

73. The method of claim 72 wherein said electrical signal is an epileptiform electrical activity, said method further comprising the steps of again detecting said electrical signal in the brain after the application of said at least one electrical burst and analyzing said electrical signal for epileptiform activity.

74. A method for treating an abnormal neurological condition comprising the steps of detecting electrical activity in the brain and applying to brain tissue a multiplicity of pulses having pulse parameters independently to different electrodes spatially separated in said brain.

75. The method of claim 74 wherein said detected electrical activity is an epileptiform electrical activity.

76. The method of claim 74 wherein said detected electrical activity predicts impending epileptiform electrical activity.

77. A method for treating an abnormal neurological condition comprising the steps of detecting electrical activity in the brain and delivering a hyper-polarizing pulse to said brain tissue prior to initiating the application of at least one electrical pulse.

78. The method of claim 77 wherein said hyper-polarizing pulse is 40 to 5000 microseconds in length.

79. The method of claim 77 wherein said hyper-polarizing pulse is comparatively lower in amplitude and longer in pulse length than pulses in said at least one electrical burst.

80. The method of claim 77 further comprising the step of detecting epileptiform activity in said brain prior to initiating the application of said at least one electrical burst.

81. The method of claim 80 further comprising the steps of determining epileptiform activity pulse-to-pulse interval and delivering a t least one pulse having a pulse-to-pulse interval in length between about 105% and about 400% of said epileptiform pulse-to-pulse interval.